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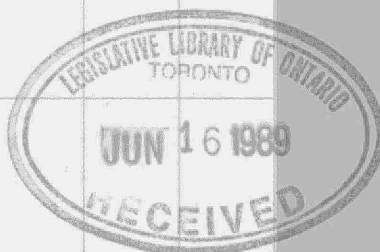
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Drinking Water Surveillance Program

SUDBURY (WANAPETEI) WATER TREATMENT PLANT

Annual Report 1987



**Environment
Ontario**

Jim Bradley, Minister

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**SUDBURY (WANAPITEI)
WATER TREATMENT PLANT**

**DRINKING WATER SURVEILLANCE
PROGRAM**

ANNUAL REPORT 1987

**ONTARIO MINISTRY OF ENVIRONMENT
OCTOBER 1988**

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ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelshoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section). Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

SUDBURY (WANAPITEI) WATER SUPPLY 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Sudbury (Wanapitei) Water Treatment Plant is a direct filtration plant that treats water from the Wanapitei River. The treatment process consists of coagulation, flocculation, filtration, disinfection and fluoridation. This plant along with the Ramsey Lake Water Supply serves a population of 95,000 and has a design capacity of 37 x 1000m³/day.

Samples of two distribution system sites were taken nine times in 1987 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Pesticides and PCB, Specific Pesticides and Volatiles).

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water; however routine bacteriological monitoring as recommended in the Ontario Drinking Water Objectives (ODWO) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the distributed supply from the Sudbury (Wanapitei) Water Treatment Plant was of good quality.

SOMMAIRE

PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

STATION D'ALIMENTATION EN EAU DE SUDBURY (WANAPITEI) RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration de Sudbury (Wanapitei) est une station de filtration sans décantation qui traite l'eau de la rivière Wanapitei. Le traitement comporte la coagulation, la floculation, la filtration, la désinfection et la fluoration. Cette station, avec celle du Lac Ramsey, dessert une population de 95 000 habitants et a une capacité nominale de 37 x 1 000 m³/jour.

En deux points de ces réseaux de distribution, 9 échantillons ont été prélevés en 1987 et analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, pesticides et BPC, pesticides particuliers et composés volatils).

Le tableau 1 résume les résultats obtenus.

En raison de la fréquence des prélèvements (un par mois), le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique systématique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les mesures des paramètres inorganiques et physiques (analyses en laboratoire et sur place, présence de métaux) étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable.

Pour environ 110 paramètres organiques mesurés chaque mois, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que l'eau distribuée à partir de la station d'épuration de Sudbury (Wanapitei) était de bonne qualité.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITE)

SUMMARY TABLE BY SCAN (1987)

SCAN	SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	19	4	21	21	3	14
CHEMISTRY (FLD)	24	24	100	28	28	100
CHEMISTRY (LAB)	224	201	89	225	197	87
METALS	267	126	47	273	144	52
CHLOROAROMATICS	91	0	0	91	0	0
PESTICIDES & PCB	175	0	0	175	0	0
SPECIFIC PESTICIDES	63	0	0	63	0	0
VOLATILES	196	21	10	196	21	10
TOTAL	1059	376		1072	393	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A ' ' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

SUDBURY (WANAPITEI) WATER SUPPLY 1987 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP was initiated at the Sudbury (Wanapitei) Water Treatment Plant in April of 1987.

PLANT DESCRIPTION

The Sudbury (Wanapitei) Water Treatment Plant is a direct filtration plant which treats water from the Wanapitei River. The process consists of coagulation, flocculation, filtration, disinfection, fluoridation and post pH adjustment. Polyelectrolyte is added as a coagulant aid. Chlorine dioxide is used for post disinfection and calcium hydroxide for post pH adjustment. This plant along with the Ramsey Lake system serves a population of approximately 95,000. It has a design capacity of 37 x 1000m³/day and daily flows ranging from 16 x 1000m³/day to 24 x 1000m³/day. This plant is currently being expanded to double its capacity.

The plant location is shown in Figure 1. General plant information is presented in Table 2.

METHODS

No samples of the raw and treated water at the treatment plant were obtained because sampling lines do not meet the DWSP requirements. Water samples were obtained from two DWSP approved locations;

- i) Distribution System - Site 1 - This house is approximately 2.7 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.
- ii) Distribution System - Site 2 - This house is approximately 5.8 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.

At the distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing due to leaching from (or deposition on) the plumbing system. The only analyses carried out on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: SUDBURY WATER TREATMENT PLANT

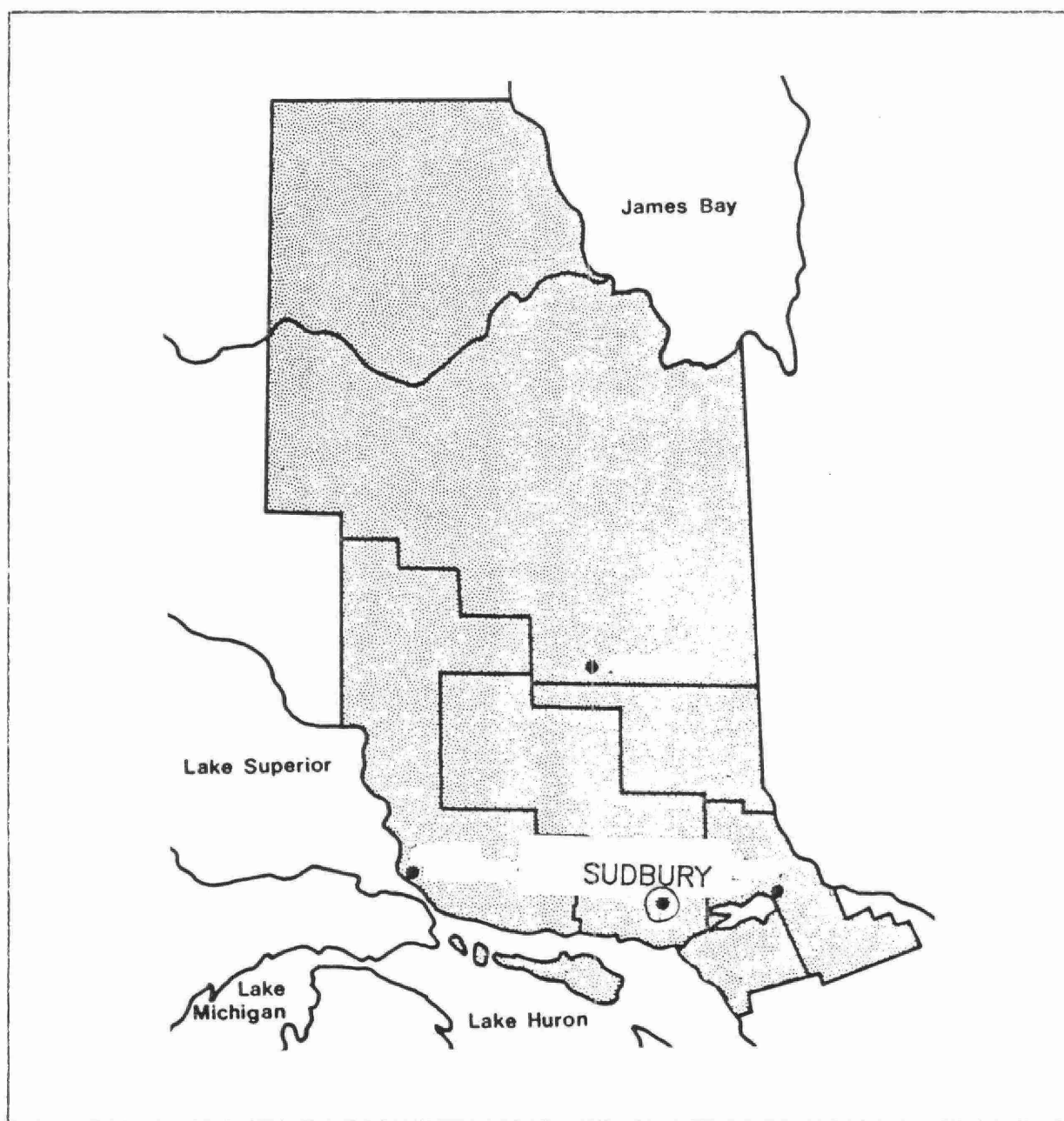


TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

SUDBURY (WANAPITEI) WATER SUPPLY SYSTEM

<u>LOCATION:</u>	HIGHWAY 17 EAST CONISTON, ONTARIO (705-694-5358)
<u>SOURCE:</u>	RAW WATER SOURCE - WANAPITEI RIVER
<u>RATED CAPACITY:</u>	27.0 (1000 M3/DAY)
<u>OPERATION:</u>	MUNICIPALITY
<u>PLANT SUPERINTENDENT:</u>	J. KRIEG
<u>MINISTRY REGION:</u>	NORTHEAST
<u>DISTRICT OFFICER:</u>	J.G. ROBERTSON

<u>MUNICIPALITY SERVED</u>	<u>POPULATION</u>
WANAPITEI	2,500
CONISTON	2,500
SUDBURY	90,453

water from the distribution main that had been flowing for five minutes before the sample was taken.

Stringent DWSP sampling protocols were followed to eliminate any variance (Appendix B).

Sample day flow, treatment chemical dosages and Field Chemistry measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered on the DWSP data base as submitted.

RESULTS

The Sudbury (Wanapitei) Water Treatment Plant distribution system was sampled for approximately 160 parameters on a monthly basis beginning in April. There were two samplings in June.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment

(MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable

values, as defined by established MOE Laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.

Bacteriology

Positive results for the Bacteriology scan were present four times in the distribution system Site 1 water and three times in the Site 2 water. The positive parameters were all Standard Plate Count.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWO is 500 organisms/mL based on a geometric mean of 5 or more samples. A high Standard Plate Count was present in the distribution system Site 2 water June sampling. A large increase in Standard Plate Count occurred in the July sample from Site 1. This could be due to increasing temperatures during the summer months.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water. Routine bacteriological monitoring as recommended in

the ODWO is carried out by the operating authority. Water in the Sudbury (Wanapitei) Water Supply, in terms of the limited DWSP bacteriological examination, was of good quality.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for Laboratory Chemistry and Field Chemistry scans were below applicable health related ODWOs.

There are ODWOs that are set for parameters which are related to aesthetic quality rather than health; one of these is Organic Nitrogen. Organic Nitrogen values are calculated by subtracting the value for Ammonia (Ammonium Total) from the value for Total Kjeldahl Nitrogen (Nitrogen Tot Kjeld). The aesthetic ODWO of 0.15 mg/L was exceeded in several of the distribution system samples. When Organic Nitrogen exceeds 0.15 mg/l in treated water some taste and odour problems can result. This guideline is exceeded in most supplies. Based on the information obtained from the DWSP, which generally indicates no problems with this parameter exceedence, the guideline may be modified when the ODWOs are reviewed.

Colour values exceeded the aesthetic ODWO of 5 True Colour Units (TCU) in five of the distribution system Site 1 standing and free flow samples. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded four times in the free flow distribution waters.

As part of the treatment plant process Sodium Silicofluoride is added to the treated water (Table 3). Where fluoridation is practised, the Fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. Maintenance of this level can be observed in the Fluoride values for most of the distribution system samples. The very low levels for November would suggest that Sodium Silicofluoride was not applied to water at the treatment plant for a limited period or was added at an insufficient dosage level.

Metals

The results reported for the Metal scan were below any applicable health related ODWOs.

Elevated levels of Copper, Lead and Zinc were generally detected in the standing samples as compared to the free flow distribution samples, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight.

The source water is soft and of low alkalinity, but the pH

correction appears to control the corrosive tendency of the water.

At present, there is no evidence that Aluminum is physiologically harmful and no limit has been specified. The measure of residual Aluminum in the treated water is important to indicate efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 0.1 mg/L as Al in the water leaving the plant. Aluminum values exceeded the ODWO operational guideline once in the distribution system Site 2 free flow water.

Organic

Chloroaromatics

The results of the Chloroaromatics group showed that two parameters were detected:

Hexachloroethane

Hexachlorobutadiene

Hexachloroethane was detected at trace levels, three times in the distribution system Site 1 water and twice in the Site 2 water.

Hexachlorobutadiene was detected at a trace level, once in the distribution system Site 2 water.

Review of these results, along with information from other water

supplies on the DWSP, would indicate that certain Chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could possibly be due to a reaction of chlorine with organics present in the water or in the distribution system.

Pesticides and PCB (Polychlorinated Biphenyl)

Within the Pesticides and PCB scan two pesticides were detected:

Alpha BHC

Lindane

Lindane consists of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the isomer most predominantly found in the Great Lakes basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, four times in the distribution system Site 1 water, and five times in the Site 2 water.

Lindane was detected at trace levels, three times in the distribution system Site 1 water and twice in the Site 2 water.

Specific Pesticides

Within the Specific Pesticide scan no pesticides were detected.

Volatiles

Within the Volatile scan three parameters, other than Trihalomethanes (THMs), were detected:

Benzene

Toluene

Ethylbenzene

Benzene was detected at trace levels, once in both distribution system waters.

Toluene was detected at trace levels, once in the distribution system Site 1 water and twice in the Site 2 water.

Ethylbenzene was detected at a trace level, once in the distribution system Site 1 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP, usually at trace levels.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane with Bromoform occurring occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were always detected in the distributed water. Chlorodibromomethane was detected at trace levels, once at both of the distribution site locations. Bromoform was not detected.

A marked increase in Total THMs occurred in the summer months; this corresponds to increases in pre-chlorine dosage (Table 3) and increases in pH and temperature in the delivered water. All THM occurrences the ODWO of 350 ug/L for Total THMs.

CONCLUSIONS

The Sudbury (Wanapitei) Water Supply for the sample year of 1987 produced good quality water throughout the distribution system.

No health related guidelines for organic or inorganic parameters, were exceeded during 1987.

RECOMMENDATIONS

Two recommendations can be made:

- 1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed could be altered to allow for a more efficient characterization of the water.

2) The plant should retrofit their sampling lines to meet with the DWSP requirements so that the plant raw and treated water can be evaluated.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SAMPLE DAY CONDITIONS			TREATMENT CHEMICAL DOSAGES (MG/L)						
DATE	RETENTION TIME(HRS)	FLOW (1000 M3)	PRE-CHLORINATION	COAGULATION	COAGULATION AID	POST-CHLORINATION	FLUORIDATION	POST PH ADJUSTMENT	TASTE & ODO
			CHLORINE	ALUM LIQUID	POLYELECTROLYTE	CHLORINE	SODIUM SILICOFLUORIDE	CALCIUM HYDROXIDE	SODIUM CHLO
APR 15	.0	17.5	1.20	15.97	.29	.75	1.13	9.48	.34
JUN 08	.0	23.7	2.06	20.98	.24	.88	1.13	13.49	.26
JUN 23	.0	23.3	.92	20.45	.24	1.99	1.00	8.66	.26
JUL 24	.0	16.4	3.01	25.73	.30	1.46	1.06	16.33	.49
SEP 29	.0	18.0	2.68	22.28	.47	1.14	.95	15.28	.55
OCT 27	.0	23.3	2.01	19.48	.42	1.00	1.00	11.70	.54
NOV 24	.0	22.1	1.94	21.24	.38	.83	1.05	10.97	.35
DEC 15	.0	21.0	1.11	22.47	.42	.49	1.14	.68	.21

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
BACTERIOLOGICAL	P/A BOTTLE	5	0	0	6	0	0
	STANDRD PLATE CNT MF	4	4	0	3	3	0
	T COLIFORM BCKGRD MF	5	0	0	6	0	0
	TOTAL COLIFORM MF	5	0	0	6	0	0
*TOTAL SCAN BACTERIOLOGICAL		19	4	0	21	3	0
*TOTAL GROUP BACTERIOLOGICAL		19	4	0	21	3	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	1	1	0
	FLD CHLORINE FREE	.	.	.	3	3	0
	FLD PH	12	12	0	8	8	0
	TEMPERATURE	12	12	0	10	10	0
	TOTAL CHLORINE	.	.	.	6	6	0
*TOTAL SCAN CHEMISTRY (FLD)		24	24	0	28	28	0
CHEMISTRY (LAB)	ALKALINITY	14	14	0	14	14	0
	AMMONIUM TOTAL	12	8	3	12	8	3
	CALCIUM	14	14	0	14	14	0
	CHLORIDE	14	13	1	14	14	0
	COLOUR	14	14	0	14	8	6
	CONDUCTIVITY	14	14	0	14	14	0
	CYANIDE	6	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
CHEMISTRY (LAB)	FLUORIDE	14	14	0	14	14	0
	HARDNESS	14	14	0	14	14	0
	MAGNESIUM	14	14	0	14	14	0
	NITRITE	12	5	4	12	4	5
	NITROGEN TOT KJELD	14	14	0	14	13	1
	PH	14	14	0	14	14	0
	RESIDUE (TOTAL)	14	14	0	14	14	0
	SODIUM	14	14	0	14	14	0
	TOTAL NITRATES	12	7	5	12	10	2
	TURBIDITY	14	14	0	14	14	0
*TOTAL SCAN CHEMISTRY (LAB)		224	201	13	225	197	17
METALS	ALUMINUM	14	13	0	14	14	0
	ARSENIC	14	0	0	14	0	0
	BARIUM	14	13	0	14	14	0
	BERYLLIUM	14	0	0	14	0	0
	BORON	14	2	3	14	2	6
	CADMIUM	13	0	0	14	4	0
	CHROMIUM	13	1	0	14	4	0
	COBALT	13	0	0	14	2	0
	COPPER	13	13	0	14	14	0
	IRON	14	13	0	14	14	0
	LEAD	14	6	0	14	7	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
METALS	MANGANESE	14	13	0	14	14	0
	MERCURY	7	4	0	7	5	0
	MOLYBDENUM	14	0	0	14	0	0
	NICKEL	13	13	0	14	14	0
	SELENIUM	14	0	0	14	0	0
	STRONTIUM	14	13	0	14	14	0
	URANIUM	14	8	0	14	5	0
	VANADIUM	14	2	0	14	3	0
	ZINC	13	12	0	14	14	0
*TOTAL SCAN METALS		267	126	3	273	144	6
*TOTAL GROUP INORGANIC & PHYSICAL		515	351	16	526	369	23
CHLOROAROMATICS	123 TRICHLOROBENZENE	7	0	0	7	0	0
	1234 T-CHLOROBENZENE	7	0	0	7	0	0
	1235 T-CHLOROBENZENE	7	0	0	7	0	0
	124 TRICHLOROBENZENE	7	0	0	7	0	0
	1245 T-CHLOROBENZENE	7	0	0	7	0	0
	135 TRICHLOROBENZENE	7	0	0	7	0	0
	236 TRICHLOROTOLUENE	7	0	0	7	0	0
	245 TRICHLOROTOLUENE	7	0	0	7	0	0
	26A TRICHLOROTOLUENE	7	0	0	7	0	0
	HEXACHLOROBUTADIENE	7	0	0	7	0	1
	HEXACHLOROETHANE	7	0	3	7	0	2

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
CHLOROAROMATICS	OCTACHLOROSTYRENE	7	0	0	7	0	0
	PENTACHLOROBENZENE	7	0	0	7	0	0
*TOTAL SCAN CHLOROAROMATICS		91	0	3	91	0	3
PESTICIDES & PCB	ALACHLOR	7	0	0	7	0	0
	ALDRIN	7	0	0	7	0	0
	ALPHA BHC	7	0	4	7	0	5
	ALPHA CHLORDANE	7	0	0	7	0	0
	ATRATONE	7	0	0	7	0	0
	BETA BHC	7	0	0	7	0	0
	DIELDRIN	7	0	0	7	0	0
	ENDRIN	7	0	0	7	0	0
	ETHYLENE DIBROMIDE	7	0	0	7	0	0
	GAMMA CHLORDANE	7	0	0	7	0	0
	HCB	7	0	0	7	0	0
	HEPTACHLOR	7	0	0	7	0	0
	HEPTACHLOR EPOXIDE	7	0	0	7	0	0
	LINDANE	7	0	3	7	0	2
	METHOXYCHLOR	7	0	0	7	0	0
	MIREX	7	0	0	7	0	0
	OPDDT	7	0	0	7	0	0
	OXYCHLORDANE	7	0	0	7	0	0
	PCB	7	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
PESTICIDES & PCB	PP-DDD	7	0	0	7	0	0
	PPDDE	7	0	0	7	0	0
	PPDDT	7	0	0	7	0	0
	THIODAN I	7	0	0	7	0	0
	THIODAN II	7	0	0	7	0	0
	THIODAN SULPHATE	7	0	0	7	0	0
*TOTAL SCAN PESTICIDES & PCB		175	0	7	175	0	7
SPECIFIC PESTICIDES	AMETRYNE	7	0	0	7	0	0
	ATRAZINE	7	0	0	7	0	0
	BLADEX	7	0	0	7	0	0
	METOLACHLOR	7	0	0	7	0	0
	PROMETONE	7	0	0	7	0	0
	PROMETRYNE	7	0	0	7	0	0
	PROPAZINE	7	0	0	7	0	0
	SENCOR	7	0	0	7	0	0
	SIMAZINE	7	0	0	7	0	0
	TOXAPHENE	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		63	0	0	63	0	0
VOLATILES	1,1 DICHLOROETHANE	7	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
VOLATILES	1,1 DICHLOROETHYLENE	7	0	0	7	0	0
	1,2 DICHLOROBENZENE	7	0	0	7	0	0
	1,2 DICHLOROETHANE	7	0	0	7	0	0
	1,2 DICHLOROPROPANE	7	0	0	7	0	0
	1,3 DICHLOROBENZENE	7	0	0	7	0	0
	1,4 DICHLOROBENZENE	7	0	0	7	0	0
	111, TRICHLOROETHANE	7	0	0	7	0	0
	112 TRICHLOROETHANE	7	0	0	7	0	0
	1122 T-CHLOROETHANE	7	0	0	7	0	0
	BENZENE	7	0	1	7	0	1
	BROMOFORM	7	0	0	7	0	0
	CARBON TETRACHLORIDE	7	0	0	7	0	0
	CHLOROBENZENE	7	0	0	7	0	0
	CHLORODIBROMOMETHANE	7	0	1	7	0	1
	CHLOROFORM	7	7	0	7	7	0
	DICHLOROBROMOMETHANE	7	7	0	7	7	0
	DICHLOROMETHANE	7	0	0	7	0	0
	ETHYLBENZENE	7	0	1	7	0	0
	M-XYLENE	7	0	0	7	0	0
	O-XYLENE	7	0	0	7	0	0
	P-XYLENE	7	0	0	7	0	0
	T-CHLOROETHYLENE	7	0	0	7	0	0
	T1,2DICHLOROETHYLENE	7	0	0	7	0	0
	TOLUENE	7	0	1	7	0	2
	TOTL TRIHALOMETHANES	7	7	0	7	7	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI)

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	SITE 1			SITE 2		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	TRICHLOROETHYLENE	7	0	0	7	0	0
	TRIFLUOROCHLOROTOLUE	7	0	0	7	0	0
*TOTAL SCAN VOLATILES		196	21	4	196	21	4
*TOTAL GROUP ORGANIC		525	21	14	525	21	14

TOTAL		1059	376	30	1072	393	37

KEY TO TABLES 5 AND 6

- A ONTARIO DRINKING WATER OBJECTIVES
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 - 1*. MAC for Bacteriological Analyses
- Poor water quality is indicated when :
- total coliform counts $> 0 < 5$
 - P/A Bottle Test is present after 48 hours
 - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
 - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
 - Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
 3. Maximum Desirable Concentration (MDC)
 4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness > 200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B HEALTH & WELFARE CANADA
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
- C WORLD HEALTH ORGANIZATION
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Guideline
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissable Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- H USSR MAXIMUM PERMISSIBLE CONCENTRATION
- I NEW YORK STATE AMBIENT WATER GUIDELINE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

BACTERIOLOGICAL					
STANDRD PLATE CNT MF (CT/ML)		DET'N LIMIT = 0		GUIDELINE = 500/ML (A1)	
APR	.	1	.	18	
JUN	.	16	.	530	
	.	29	.	!AW	
JUL	.	333	.	.	
OCT	.	.	.	26	
NOV	.	!AW	.	!AW	
DEC	.	.	.	!AW	

P/A BOTTLE (0=ABSENT)		DET'N LIMIT = 0		GUIDELINE = 0 (A1*)	
APR	.	0	.	0	
JUN	.	0	.	0	
	.	0	.	0	
JUL	.	0	.	.	
OCT	.	.	.	0	
NOV	.	0	.	0	
DEC	.	.	.	0	

TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)	
APR	.	0	.	0	
JUN	.	0	.	0	
	.	0	.	0	
JUL	.	0	.	.	
OCT	.	.	.	0	
NOV	.	0	.	0	
DEC	.	.	.	0	

T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A	
APR	.	0	.	0	
JUN	.	0	.	0	
	.	0	.	0	
JUL	.	0	.	.	
OCT	.	.	.	0	
NOV	.	0	.	0	
DEC	.	.	.	0	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING	FREE FLOW	STANDING	FREE FLOW		

CHEMISTRY (FLD)					
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = N/A		GUIDELINE =	N/A
NOV	.	.	.	.200	

FLD CHLORINE FREE (MG/L)		DET'N LIMIT = N/A		GUIDELINE =	N/A
JUN	.	.	.	.010	
NOV	.	.	.100	.100	

TOTAL CHLORINE (MG/L)		DET'N LIMIT = N/A		GUIDELINE =	N/A
JUN	.	.	.100	.100	
	.	.	.100	.100	
NOV	.	.	.100	.300	

FLD PH (DMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
APR	7.200	7.200	6.800	7.200	
JUN	7.500	7.600	7.500	7.600	
	7.400	7.400	7.200	8.400	
JUL	7.400	7.800	.	.	
SEP	7.200	7.800	.	.	
NOV	7.800	8.000	7.200	7.200	

TEMPERATURE (DEG.C)		DET'N LIMIT = N/A		GUIDELINE =	N/A
APR	18.000	5.000	21.000	8.000	
JUN	16.000	14.000	21.000	11.000	
	19.500	17.200	24.000	13.000	
JUL	21.000	19.900	.	.	
SEP	17.800	17.100	21.000	16.000	
NOV	13.000	9.000	24.000	11.000	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING	FREE FLOW	STANDING	FREE FLOW		

CHEMISTRY (LAB)					
ALKALINITY (MG/L)		DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)	
APR	17.900	16.700	19.000	18.600	
JUN	22.600	19.600	21.900	20.700	
	21.800	21.100	26.100	24.700	
JUL	24.900	24.500	.	.	
AUG	25.600	24.700	.	.	
SEP	23.700	23.400	24.000	24.500	
OCT	.	.	23.000	21.300	
NOV	19.600	20.500	20.600	20.800	
DEC	.	.	16.500	14.700	

CALCIUM (MG/L)		DET'N LIMIT = .100		GUIDELINE = 100. (F2)	
APR	12.700	12.700	13.200	13.500	
JUN	16.200	16.600	18.400	18.200	
	15.800	15.400	16.800	17.600	
JUL	17.800	17.800	.	.	
AUG	21.800	21.200	.	.	
SEP	17.800	17.800	18.400	17.800	
OCT	.	.	15.000	15.200	
NOV	17.000	18.600	18.000	18.800	
DEC	.	.	14.000	14.600	

CHLORIDE (MG/L)		DET'N LIMIT = .200		GUIDELINE = 250.0 (A3)	
APR	2.500	2.500	4.500	3.000	
JUN	2.500	2.000 <T	3.000	2.500	
	3.500	3.500	23.500	4.000	
JUL	5.500	5.000	.	.	
AUG	9.000	9.000	.	.	
SEP	4.000	4.000	4.000	4.000	
OCT	.	.	3.800	4.500	
NOV	3.100	3.100	3.400	3.200	
DEC	.	.	2.500	2.200	

COLOUR (TCU)		DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)	
APR	8.000	6.500	4.000	3.500	
JUN	7.500	7.000	3.000	3.000	
	9.500	8.000	3.000	4.000	
JUL	5.500	5.500	.	.	
AUG	6.000	6.500	.	.	
SEP	4.500	3.000	1.500 <T	1.500 <T	
OCT	.	.	2.000 <T	1.500 <T	
NOV	3.500	3.500	1.500 <T	1.500 <T	
DEC	.	.	3.000	3.500	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

CONDUCTIVITY (UMHO/CM)		DET'N LIMIT = 1		GUIDELINE = 400. (F2)	
APR	105	103	115	109	
JUN	127	123	129	126	
	118	115	198	124	
JUL	137	134	.	.	
AUG	157	148	.	.	
SEP	121	120	124	124	
OCT	.	.	122	120	
NOV	121	122	124	120	
DEC	.	.	121	117	

FLUORIDE (MG/L)		DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)	
APR	1.200	1.070	1.250	1.210	
JUN	1.120	1.120	1.120	1.120	
	1.070	1.140	.980	1.350	
JUL	1.190	1.180	.	.	
AUG	.980	.980	.	.	
SEP	1.000	1.000	1.040	1.040	
OCT	.	.	1.100	1.140	
NOV	.100	.080	.140	.100	
DEC	.	.	1.020	1.100	

HARDNESS (MG/L)		DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)	
APR	40.000	40.000	41.500	42.000	
JUN	49.000	50.000	60.000	60.000	
	49.000	48.000	52.000	50.000	
JUL	54.000	54.000	.	.	
AUG	65.000	63.000	.	.	
SEP	57.000	57.000	58.000	56.000	
OCT	.	.	47.000	47.000	
NOV	53.000	57.000	54.000	56.000	
DEC	.	.	45.000	46.000	

MAGNESIUM (MG/L)		DET'N LIMIT = .050		GUIDELINE = 30. (F2)	
APR	1.900	2.000	2.100	2.000	
JUN	2.200	2.100	3.500	3.500	
	2.300	2.200	2.500	1.500	
JUL	2.200	2.300	.	.	
AUG	2.700	2.500	.	.	
SEP	3.100	3.000	2.900	2.900	
OCT	.	.	2.300	2.200	
NOV	2.500	2.500	2.200	2.300	
DEC	.	.	2.500	2.400	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

SODIUM (MG/L)		DET'N LIMIT = .200		GUIDELINE = 200. (C3)	
APR	1.800	1.800	3.100	2.100	
JUN	2.200	2.000	2.400	2.400	
	1.600	1.600	11.600	2.200	
JUL	2.000	2.400	.	.	
AUG	1.800	1.600	.	.	
SEP	1.800	2.000	1.800	2.000	
OCT	.	.	2.600	2.400	
NOV	1.600	1.400	1.600	1.400	
DEC	.	.	1.800	1.800	

AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)	
APR	.008 <T	.014	.006 <T	.008 <T	
JUN	!SD	!SD	!SD	!SD	
	.048	.012	.156	.018	
JUL	.024	.008 <T	.	.	
AUG	.044	.012	.	.	
SEP	.022	.008 <T	.010	.012	
OCT	.	.	.074	.010	
NOV	.086	BDL	.176	BDL	
DEC	.	.	.094	.006 <T	

NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)	
APR	.007	.007	.010	.007	
JUN	!SD	!SD	!SD	!SD	
	.006	.005	.005	.006	
JUL	.001 <T	BDL	.	.	
AUG	.005	.003 <T	.	.	
SEP	.003 <T	.002 <T	.003 <T	.003 <T	
OCT	.	.	.002 <T	.001 <T	
NOV	BDL	BDL	BDL	BDL	
DEC	.	.	.001 <T	BDL	

TOTAL NITRATES (MG/L)		DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)	
APR	.195	.195	.205	.195	
JUN	!SD	!SD	!SD	!SD	
	.135	.075 <T	.155	.080 <T	
JUL	.060 <T	.045 <T	.	.	
AUG	.100	.070 <T	.	.	
SEP	.110	.070 <T	.110	.080 <T	
OCT	.	.	.230	.130	
NOV	.300	.210	.410	.215	
DEC	.	.	.320	.205	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = .020		GUIDELINE = N/A
APR	.110	.220	.110	.100
JUN	.240 UAL	.130 UAL	.220 UAL	.120 UAL
	.230	.140	.170	.650
JUL	.150	.120	.	.
AUG	.230	.170	.	.
SEP	.150	.140	.130	.130
OCT	.	.	.280	.180
NOV	.190	.100	.340	.100
DEC	.	.	.250	.090 <T
PH (DMSNLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
APR	7.720	7.590	7.610	7.730
JUN	7.890	7.920	7.630	7.910
	7.820	7.820	7.490	9.030
JUL	7.710	7.970	.	.
AUG	7.710	7.740	.	.
SEP	7.780	7.910	7.780	8.000
OCT	.	.	7.650	7.560
NOV	7.500	7.520	7.510	7.570
DEC	.	.	7.440	7.370
RESIDUE (TOTAL) (MG/L)		DET'N LIMIT = 1.		GUIDELINE = 500. (A3)
APR	68 CRO	67 CRO	75 CRO	71 CRO
JUN	82 CRO	80 CRO	87 CRO	83 CRO
	77 CRO	75 CRO	129 CRO	80 CRO
JUL	89 CRO	87 CRO	.	.
AUG	118	117	.	.
SEP	79 CRO	78 CRO	81 CRO	80 CRO
OCT	.	.	79 CRO	78 CRO
NOV	79 CRO	77 CRO	80 CRO	78 CRO
DEC	.	.	78 CRO	76 CRO
TURBIDITY (FTU)		DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)
APR	.600	.400	.370	.130
JUN	.570	.580	.230	.130
	.460	.490	.260	.220
JUL	.360	.430	.	.
AUG	1.040	.410	.	.
SEP	.350	.300	.180	.110
OCT	.	.	.550	.110
NOV	.210	.580	.210	.140
DEC	.	.	.470	.340

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

METALS					
ALUMINUM (MG/L)		DET'N LIMIT = .004		GUIDELINE = .10 (A4)	
APR	.071	.083	.081	.094	
JUN	.040	.039	.062	.058	
	.057	.061	.033	.250	
JUL	.092	BDL	.	.	
AUG	.053	.055	.	.	
SEP	.051	.050	.050	.046	
OCT	.	.	.074	.071	
NOV	.066	.068	.078	.075	
DEC	.	.	.014	.018	

BARIUM (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)	
APR	.020	.018	.018	.015	
JUN	.016	.018	.018	.017	
	.020	.022	.025	.010	
JUL	.016	BDL	.	.	
AUG	.017	.012	.	.	
SEP	.014	.014	.014	.015	
OCT	.	.	.014	.014	
NOV	.013	.013	.014	.014	
DEC	.	.	.026	.021	

BORON (MG/L)		DET'N LIMIT = 0.01		GUIDELINE = 5.000 (A1)	
APR	.010	.010	.010	.010	
JUN	BDL	BDL	BDL	BDL	
	BDL	.010 <T	.010 <T	.010 <T	
JUL	BDL	BDL	.	.	
AUG	BDL	BDL	.	.	
SEP	BDL	BDL	.010 <T	BDL	
OCT	.	.	BDL	BDL	
NOV	.017 <T	.014 <T	.036 <T	.013 <T	
DEC	.	.	.040 <T	BDL	

CADMIUM (UG/L)		DET'N LIMIT = 0.300		GUIDELINE = 5.000 (A1)	
APR	BDL	BDL	BDL	BDL	
JUN	BDL	BDL	BDL	BDL	
	BDL	BDL	.300	BDL	
JUL	BDL	! IS	.	.	
AUG	BDL	BDL	.	.	
SEP	BDL	BDL	BDL	BDL	
OCT	.	.	.400	2.000	
NOV	BDL	BDL	BDL	BDL	
DEC	.	.	.400	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING	FREE FLOW	STANDING	FREE FLOW		
COBALT (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.0	(H)
APR	BDL	BDL	BDL	BDL	
JUN	BDL	BDL	BDL	BDL	
	BDL	BDL	BDL	BDL	
JUL	BDL	! IS	.	.	
AUG	BDL	BDL	.	.	
SEP	BDL	BDL	BDL	BDL	
OCT	.	.	BDL	BDL	
NOV	BDL	BDL	BDL	BDL	
DEC	.	.	.002	.002	
CHROMIUM (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = .05	(A1)
APR	BDL	BDL	BDL	BDL	
JUN	BDL	BDL	.001	BDL	
	BDL	BDL	BDL	BDL	
JUL	BDL	! IS	.	.	
AUG	BDL	BDL	.	.	
SEP	BDL	BDL	BDL	BDL	
OCT	.	.	BDL	.001	
NOV	BDL	.001	.001	.001	
DEC	.	.	BDL	BDL	
COPPER (MG/L)		DET'N LIMIT = .001		GUIDELINE = 1.0	(A3)
APR	.067	.009	.081	.026	
JUN	.008	.043	.059	.011	
	.051	.011	.130	.014	
JUL	.027	! IS	.	.	
AUG	.049	.010	.	.	
SEP	.030	.007	.015	.050	
OCT	.	.	.084	.019	
NOV	.017	.005	.068	.008	
DEC	.	.	.490	.074	
IRON (MG/L)		DET'N LIMIT = .002		GUIDELINE = .300	(A3)
APR	.310	.240	.039	.038	
JUN	.230	.260	.089	.032	
	.280	.300	.066	.045	
JUL	.210	BDL	.	.	
AUG	.190	.210	.	.	
SEP	.150	.130	.012	.010	
OCT	.	.	.023	.035	
NOV	.140	.160	.022	.024	
DEC	.	.	.063	.064	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

MERCURY (UG/L)			DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)
APR	.	BDL	.	BDL	
JUN	.	BDL	.	BDL	
	.	BDL	.	.010	
JUL	.	.010	.	.	
AUG	.	.010	.	.	
SEP	.	.010	.	.010	
OCT	.	.	.	.010	
NOV	.	.010	.	.010	
DEC	.	.	.	.020	

MANGANESE (MG/L)			DET'N LIMIT = .001		GUIDELINE = .050 (A3)
APR	.017	.017	.011	.012	
JUN	.011	.013	.006	.006	
	.012	.015	.013	.004	
JUL	.010	BDL	.	.	
AUG	.009	.012	.	.	
SEP	.008	.008	.003	.003	
OCT	.	.	.003	.005	
NOV	.008	.010	.005	.006	
DEC	.	.	.015	.015	

NICKEL (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .05 (F3)
APR	.024	.024	.033	.027	
JUN	.017	.022	.015	.018	
	.020	.021	.066	.012	
JUL	.011	!!S	.	.	
AUG	.011	.007	.	.	
SEP	.007	.006	.007	.009	
OCT	.	.	.008	.011	
NOV	.015	.018	.011	.016	
DEC	.	.	.088	.059	

LEAD (MG/L)			DET'N LIMIT = 0.003		GUIDELINE = .050 (A1)
APR	.006	BDL	.011	BDL	
JUN	BDL	.005	.005	BDL	
	.004	BDL	.010	BDL	
JUL	BDL	BDL	.	.	
AUG	.005	.007	.	.	
SEP	.004	BDL	BDL	.005	
OCT	.	.	.004	BDL	
NOV	BDL	BDL	.003	BDL	
DEC	.	.	.007	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW
STRONTIUM (MG/L)		DET'N LIMIT = .001		GUIDELINE = 2.00 (H)	
APR	.023	.022	.026	.024	
JUN	.027	.027	.028	.027	
	.028	.030	.036	.026	
JUL	.029	BDL	.	.	
AUG	.029	.030	.	.	
SEP	.025	.024	.024	.025	
OCT	.	.	.025	.025	
NOV	.025	.025	.025	.026	
DEC	.	.	.030	.027	
URANIUM (UG/L)		DET'N LIMIT = .02		GUIDELINE = 20. (A2)	
APR	.020	.010	.020	.010	
JUN	.020	.020	.030	.020	
	BDL	.010	BDL	BDL	
JUL	.040	.040	.	.	
AUG	BDL	.100	.	.	
SEP	BDL	BDL	BDL	BDL	
OCT	.	.	.100	BDL	
NOV	BDL	BDL	BDL	BDL	
DEC	.	.	BDL	BDL	
VANADIUM (MG/L)		DET'N LIMIT = .001		GUIDELINE = .10 (H)	
APR	BDL	BDL	BDL	BDL	
JUN	BDL	BDL	BDL	BDL	
	BDL	BDL	BDL	.001	
JUL	BDL	BDL	.	.	
AUG	BDL	BDL	.	.	
SEP	.001	BDL	BDL	.001	
OCT	.	.	BDL	BDL	
NOV	BDL	.001	BDL	.002	
DEC	.	.	BDL	BDL	
ZINC (MG/L)		DET'N LIMIT = .001		GUIDELINE = 5.00 (A3)	
APR	.011	.006	.014	.003	
JUN	.002	.013	.008	.001	
	.009	.004	.033	.001	
JUL	.005	! IS	.	.	
AUG	.009	.002	.	.	
SEP	.004	BDL	.002	.005	
OCT	.	.	.007	.003	
NOV	.005	.002	.007	.002	
DEC	.	.	.046	.015	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM			
SITE 1		SITE 2					
STANDING		FREE FLOW		STANDING		FREE FLOW	

CHLOROAROMATICS							
HEXACHLOROBUTADIENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 450. (D4)			
APR	.	BDL	.	1.000 <T			
JUN	.	BDL	.	BDL			
	.	BDL	.	BDL			
JUL	.	BDL	.	.			
AUG	.	BDL	.	.			
SEP	.	BDL	.	BDL			
OCT	.	.	.	BDL			
NOV	.	BDL	.	BDL			
DEC	.	.	.	BDL			

HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 1900. (D4)			
APR	.	3.000 <T	.	3.000 <T			
JUN	.	2.000 <T	.	BDL			
	.	BDL	.	2.000 <T			
JUL	.	4.000 <T	.	.			
AUG	.	BDL	.	.			
SEP	.	BDL	.	BDL			
OCT	.	.	.	BDL			
NOV	.	BDL	.	BDL			
DEC	.	.	.	BDL			

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1

SITE 2

STANDING

FREE FLOW

STANDING

FREE FLOW

PESTICIDES & PCB

ALPHA BHC (NG/L)

DET'N LIMIT = 1.000

GUIDELINE = 700. (G)

APR	.	3.000 <T	.	2.000 <T
JUN	.	2.000 <T	.	1.000 <T
	.	2.000 <T	.	3.000 <T
JUL	.	1.000 <T	.	.
AUG	.	BDL	.	.
SEP	.	BDL	.	BDL
OCT	.	.	.	1.000 <T
NOV	.	BDL	.	BDL
DEC	.	.	.	3.000 <T

LINDANE (NG/L)

DET'N LIMIT = 1.000

GUIDELINE = 4000.0 (A1)

APR	.	1.000 <T	.	BDL
JUN	.	1.000 <T	.	BDL
	.	2.000 <T	.	1.000 <T
JUL	.	BDL	.	.
AUG	.	BDL	.	.
SEP	.	BDL	.	BDL
OCT	.	.	.	4.000 <T
NOV	.	BDL	.	BDL
DEC	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING		FREE FLOW	STANDING		FREE FLOW

VOLATILES					
BENZENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 5.0	(D1)
APR	.	BDL	.	BDL	
JUN	.	BDL	.	BDL	
	.	.100 <T	.	.200 <T	
JUL	.	BDL	.	.	
AUG	.	BDL	.	.	
SEP	.	BDL	.	BDL	
OCT	.	.	.	BDL	
NOV	.	BDL	.	BDL	
DEC	.	.	.	BDL	

TOLUENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 100.0	(G)
APR	.	BDL	.	BDL	
JUN	.	BDL	.	BDL	
	.	.100 <T	.	.100 <T	
JUL	.	BDL	.	.	
AUG	.	BDL	.	.	
SEP	.	BDL	.	BDL	
OCT	.	.	.	.050 <T	
NOV	.	BDL	.	BDL	
DEC	.	.	.	BDL	

ETHYLBENZENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 3400.	(D3)
APR	.	BDL	.	BDL	
JUN	.	BDL	.	BDL	
	.	BDL	.	BDL	
JUL	.	BDL	.	.	
AUG	.	BDL	.	.	
SEP	.	BDL	.	BDL	
OCT	.	.	.	BDL	
NOV	.	.050 <T	.	BDL	
DEC	.	.	.	BDL	

CHLOROFORM (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
APR	.	50.000	.	64.000	
JUN	.	61.600	.	63.900	
	.	78.900	.	77.000	
JUL	.	125.000	.	.	
AUG	.	280.000	.	.	
SEP	.	130.000	.	130.000	
OCT	.	.	.	84.400	
NOV	.	76.600	.	83.700	
DEC	.	.	.	32.600	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
SITE 1		SITE 2			
STANDING	FREE FLOW	STANDING	FREE FLOW		
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
APR	.	1.000	.	2.000	
JUN	.	1.600	.	1.600	
	.	1.900	.	1.700	
JUL	.	3.200	.	.	
AUG	.	4.900	.	.	
SEP	.	2.800	.	2.800	
OCT	.	.	.	2.400	
NOV	.	1.700	.	2.000	
DEC	.	.	.	1.000	
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
APR	.	.800 <T	.	.400 <T	
JUN	.	BDL	.	BDL	
	.	BDL	.	BDL	
JUL	.	BDL	.	.	
AUG	.	BDL	.	.	
SEP	.	BDL	.	BDL	
OCT	.	.	.	BDL	
NOV	.	BDL	.	BDL	
DEC	.	.	.	BDL	
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1)	
APR	.	51.800	.	66.400	
JUN	.	63.200	.	65.500	
	.	80.800	.	78.700	
JUL	.	128.200	.	.	
AUG	.	284.900	.	.	
SEP	.	132.800	.	132.800	
OCT	.	.	.	86.800	
NOV	.	78.300	.	85.700	
DEC	.	.	.	33.600	

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
----	-----	-----	-----	-----
CHEMISTRY (LAB)	CYANIDE	14	0.001	.200 (A1) MG/L
METALS	ARSENIC	28	0.001	.050 (A1) MG/L
	BERYLLIUM	28	0.001	.0002 (H) MG/L
	MOLYBDENUM	28	0.001	.50 (H) MG/L
	SELENIUM	28	0.001	.010 (A1) MG/L
CHLOROAROMATICS	123 TRICHLOROBENZENE	14	5.000	10000. (I) NG/L
	1234 T-CHLOROBENZENE	14	1.000	10000. (I) NG/L
	1235 T-CHLOROBENZENE	14	1.000	10000. (I) NG/L
	124 TRICHLOROBENZENE	14	5.000	10000. (I) NG/L
	1245 T-CHLOROBENZENE	14	1.000	38000. (D4) NG/L
	135 TRICHLOROBENZENE	14	5.000	10000. (D4) NG/L
	OCTACHLOROSTYRENE	14	1.000	N/A NG/L
	PENTACHLOROBENZENE	14	1.000	74000. (D4) NG/L
	236 TRICHLOROTOLUENE	14	5.000	N/A NG/L
	245 TRICHLOROTOLUENE	14	5.000	N/A NG/L
	26A TRICHLOROTOLUENE	14	5.000	N/A NG/L
PESTICIDES & PCB	ALDRIN	14	1.000	700.0 (A1) NG/L
	BETA BHC	14	1.000	300. (G) NG/L
	ALPHA CHLORDANE	14	2.000	7000.0 (A1) NG/L
	GAMMA CHLORDANE	14	2.000	7000.0 (A1) NG/L
	DIELDRIN	14	2.000	700.0 (A1) NG/L
	METHOXYCHLOR	14	5.000	100000. (A1) NG/L
	THIODAN I	14	2.000	74000. (D4) NG/L
	THIODAN II	14	4.000	74000. (D4) NG/L
	ENDRIN	14	4.000	200.0 (A1) NG/L
	THIODAN SULPHATE	14	4.000	N/A NG/L
	HEPTACHLOR EPOXIDE	14	1.000	3000.0 (A1) NG/L
	HEPTACHLOR	14	1.000	3000.0 (A1) NG/L
	MIREX	14	5.000	N/A NG/L
	OXYCHLORDANE	14	2.000	N/A NG/L
	OPDDT	14	5.000	30000. (A1) NG/L
	PCB	14	20.000	3000. (A2) NG/L
	PP-DDD	14	5.000	N/A NG/L
	PPDDE	14	1.000	30000. (A1) NG/L
	PPDDT	14	5.000	30000. (A1) NG/L
	ATRATONE	14	50.	N/A NG/L
	ALACHLOR	14	500.	35000. (D2) NG/L
	ETHYLENE DIBROMIDE	14	0	50.0 (G) UG/L
	HCB	14	1.000	10.0 (C1) NG/L
SPECIFIC PESTICIDES	TOXAPHENE	14	N/A	5000. (A1) NG/L
	AMETRYNE	14	50.00	300000. (D3) NG/L
	ATRAZINE	14	50.00	60000. (B3) NG/L
	BLADEX	14	100.00	10000. (B3) NG/L
	PROMETONE	14	50.00	52500. (D3) NG/L
	PROPACINE	14	50.00	16000. (D2) NG/L
	PROMETRYNE	14	50.00	1000. (B3) NG/L
	SENCOR	14	100.00	80000. (B2) NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (WANAPITEI) 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
-----	-----	-----	-----	-----
SPECIFIC PESTICIDES	SIMAZINE	14	50.00	10000. (B3) NG/L
	METOLACHLOR	14	500.	50000. (B3) NG/L
VOLATILES	P-XYLENE	14	0	620. (G) UG/L
	M-XYLENE	14	0	620. (G) UG/L
	O-XYLENE	14	0	620. (G) UG/L
	1,1 DICHLOROETHYLENE	14	0	7.0 (D1) UG/L
	DICHLOROMETHANE	14	0	1750. (D3) UG/L
	T1,2DICHLOROETHYLENE	14	0	350. (D3) UG/L
	1,1 DICHLOROETHANE	14	0	N/A UG/L
	111, TRICHLOROETHANE	14	0	200. (D1) UG/L
	1,2 DICHLOROETHANE	14	0	5.0 (D1) UG/L
	CARBON TETRACHLORIDE	14	0	5.0 (D1) UG/L
	1,2 DICHLOROPROPANE	14	0	10.0 (G) UG/L
	TRICHLOROETHYLENE	14	0	5.0 (D1) UG/L
	112 TRICHLOROETHANE	14	0	.60 (D4) UG/L
	T-CHLOROETHYLENE	14	0	10.0 (C2) UG/L
	BROMOFORM	14	0	350.0 (A1+) UG/L
	1122 T-CHLOROETHANE	14	0	0.17 (D4) UG/L
	CHLOROBENZENE	14	0	1510. (D3) UG/L
	1,4 DICHLOROBENZENE	14	0	75.0 (D1) UG/L
	1,3 DICHLOROBENZENE	14	0	130. (G) UG/L
	1,2 DICHLOROBENZENE	14	0	130. (G) UG/L
	TRIFLUOROCHLOROTOLUE	14	0	N/A UG/L

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in early 1988 and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" is issued. This assures that operational staff, health authorities and the public are notified as soon as possible and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

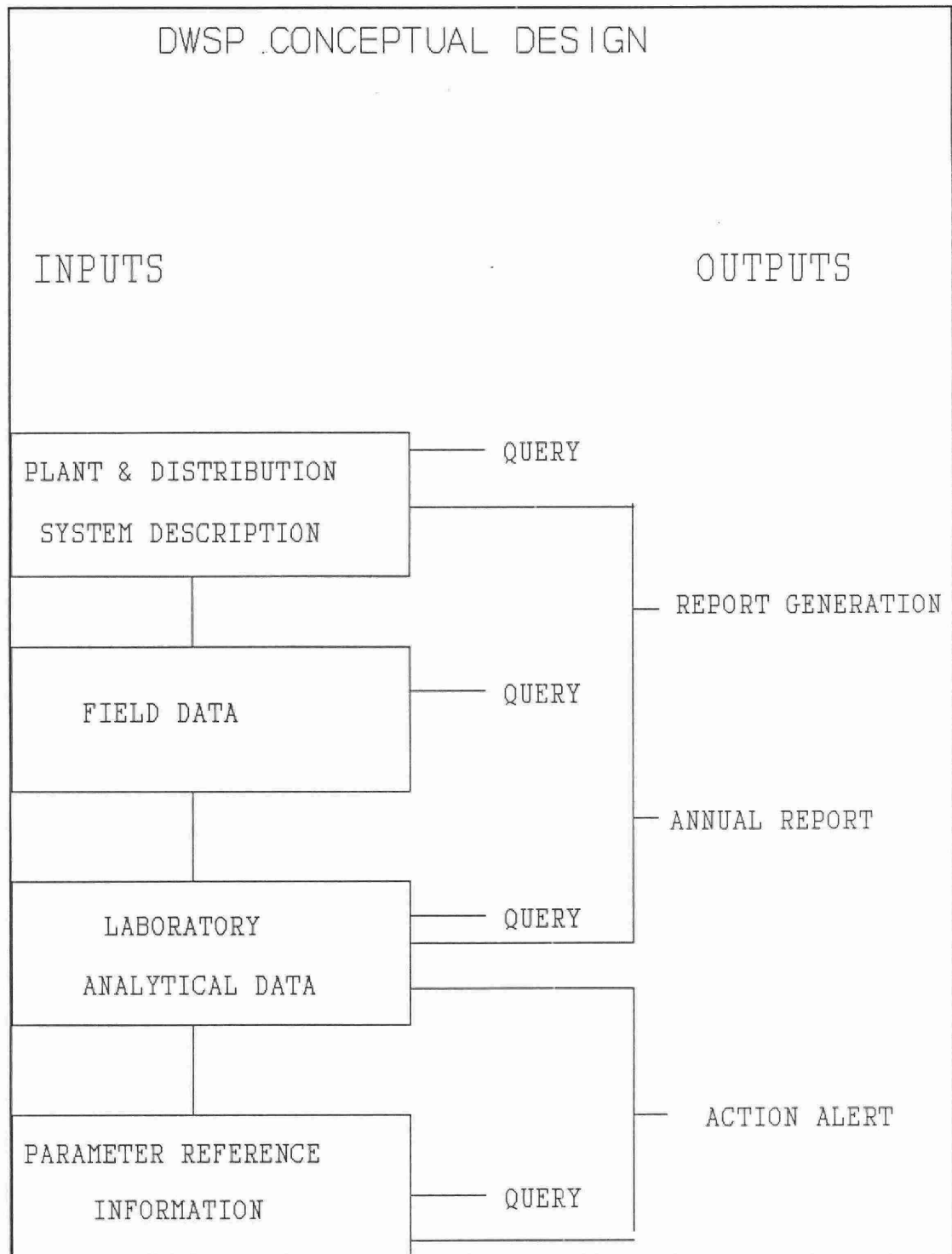


FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)
REFERENCE
BENZENE

PARAMETER

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),
CYCLOHEXATRIENE (41)CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL

TISSUES

METABOLIC

THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR

SITES (LIVER, BRAIN), SMALL QUANTITIES EVAPORATE FROM
SOIL OR DEGRADE QUICKLY (80).SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL
TAR DISTILLATION, FOOD PROCESSING, TANNING.USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE INPESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,
DEGREASING AND CLEANSING AGENT, GASOLINE.TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES
MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS,
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;
CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM
FOLLOWED BY SEDIMENTATION, COAGULATION AND
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

(27)

HENRY'S LAW CONSTANT: 0.00555 ATM M_2 /MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC), (OWTRI), (OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)

Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (**Caution:** HNO_3 and KCrO_7 corrosive)

Phenols

- 250 mL clear glass bottle
- do not rinse bottle
- fill to top of label as marked

Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC), (OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (Caution: NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (Caution: HNO_3 and KCrO_7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.



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